



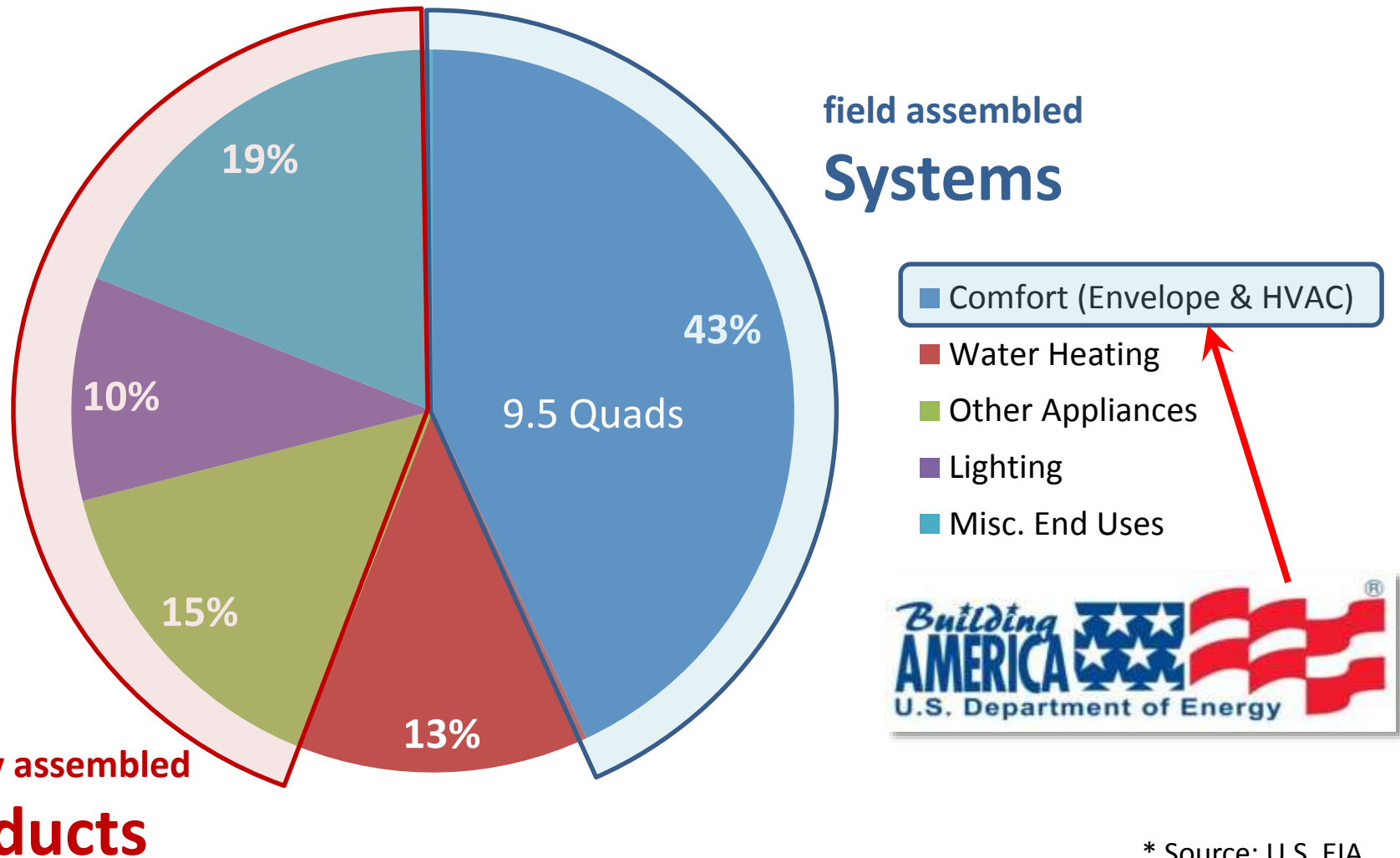
## Building America Technology to Market Roadmaps

**ERIC WERLING**

Building America Program Director

Building Technology Office

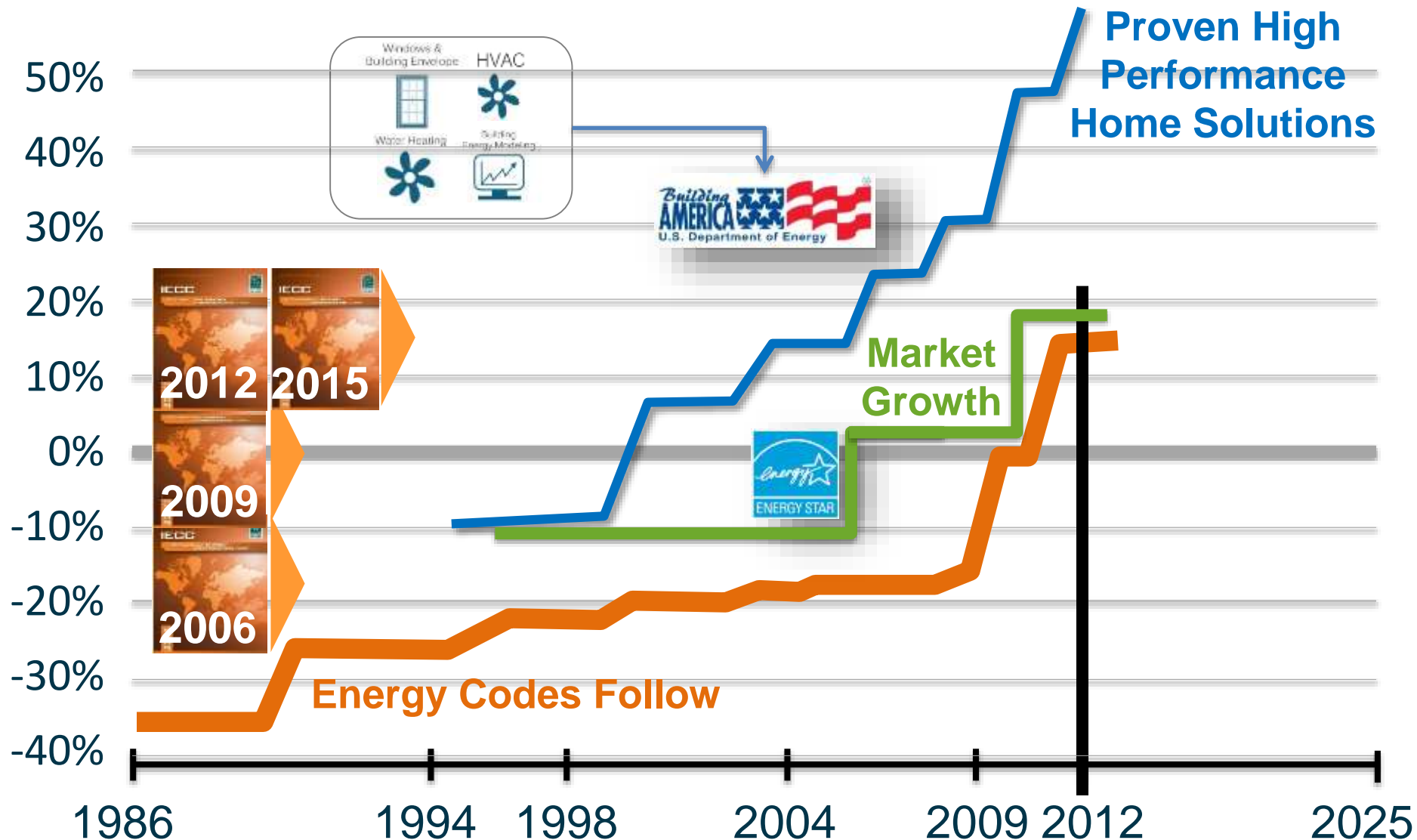
# U.S. Residential Buildings Primary Energy Consumption (22 Quads)\*



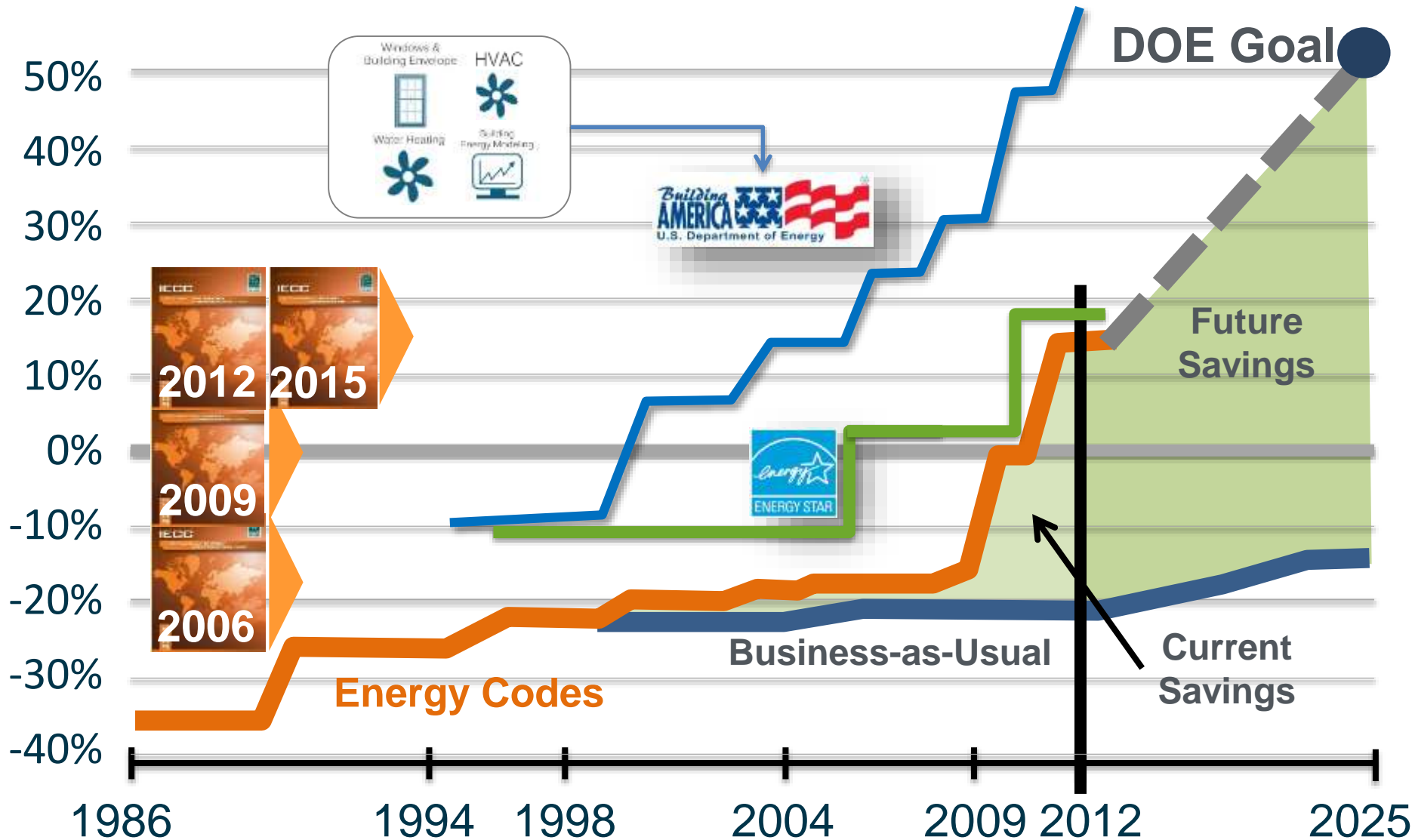
\* Source: U.S. EIA



# Research to Market to Standard Practice

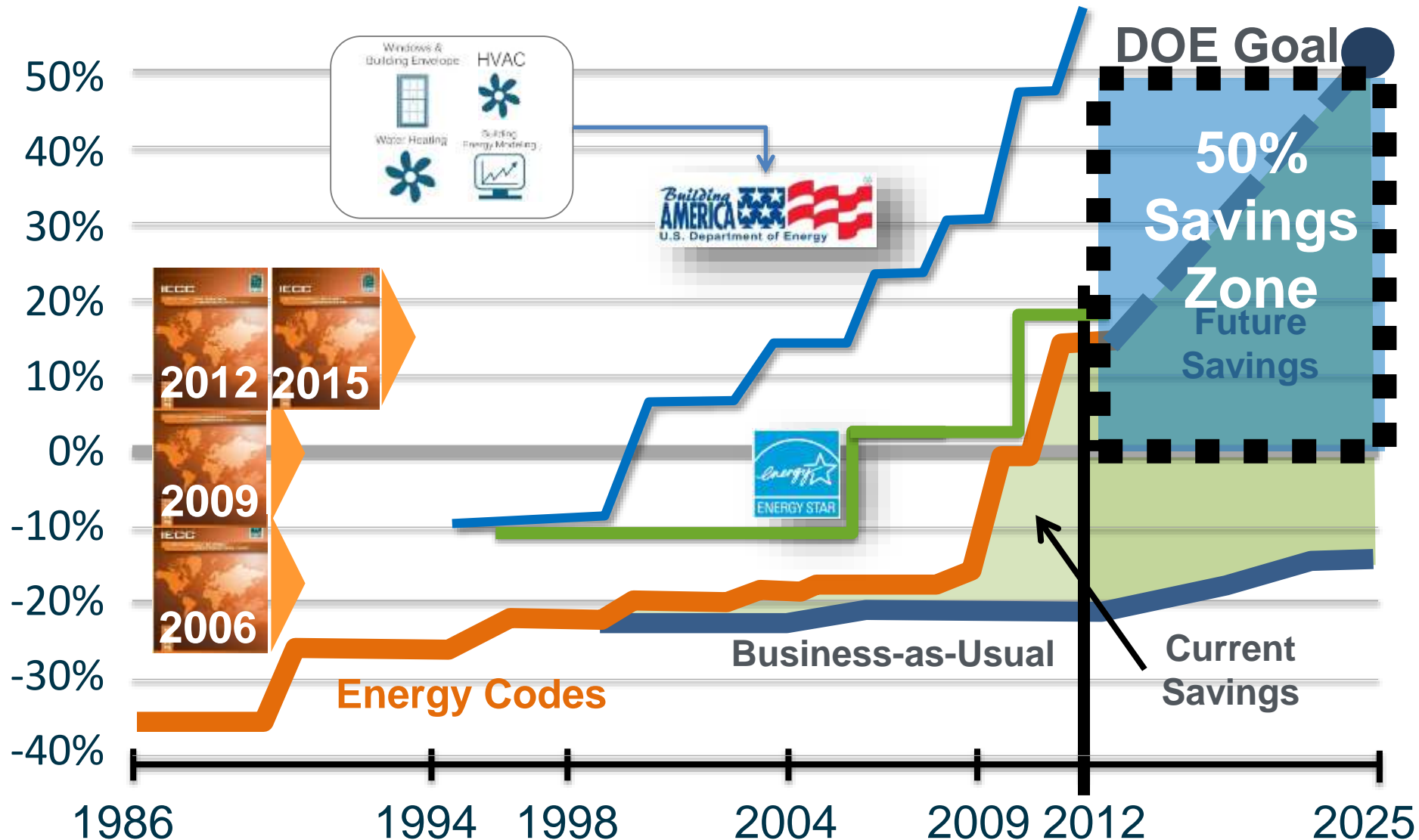


# Current & Future Savings



\* Which ultimately sets the bar for future existing homes infrastructure

# But How Can We Achieve 50% Savings?



\* Which ultimately sets the bar for future existing homes infrastructure

# DOE 50% Savings Scenarios Require...

## More Insulation & Tighter Construction That Can:

- **Cause Envelope Assemblies to Get/Stay Wet**

Increased insulation levels and air tightness can elevate risk of condensation and substantially limit drying potential inside building assemblies

- **Lower Airflow & Increase Indoor RH**

Lower loads reduce air flow, increase relative latent load, extend swing seasons

- **Reduce Fresh Outdoor Air Exchange**

Added air tightness demands improved source control, dilution, and filtration

**If these performance issues are not solved, high efficiency homes will have comfort and durability problems, builders will not go further than current code, and future energy code advancement will be prevented.**

# **We Need High Performance Home Solutions!**

## **Energy Efficient New and Existing Homes with ...**

### **Moisture Managed High-R Envelopes**

- **Are Less Likely to Get/Stay Wet**  
High performance homes with increased insulation, reduced infiltration, reduced risk of condensation, & adequate drying potential inside building assemblies

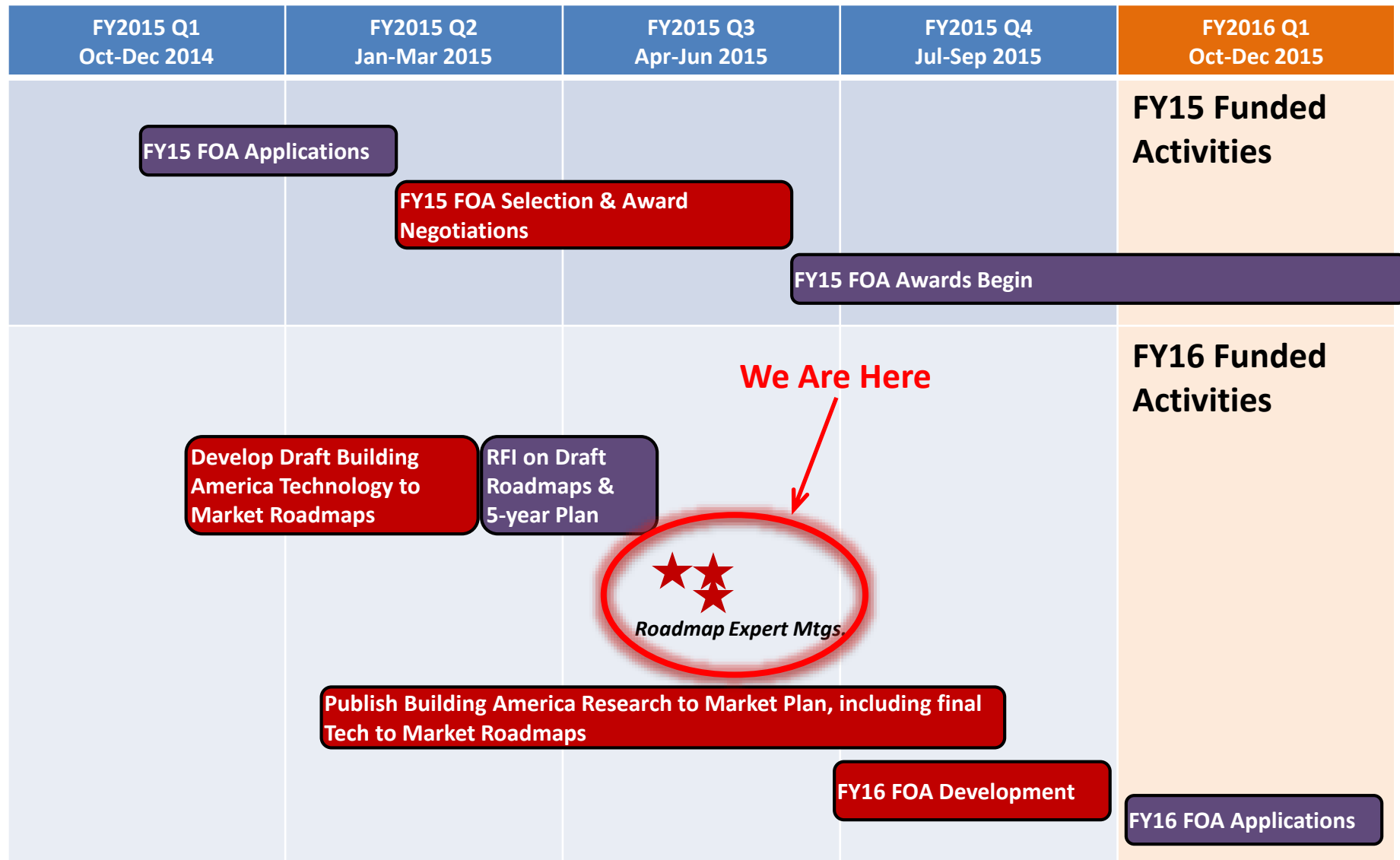
### **Optimized Low-Load Comfort Solutions**

- **Effectively Manage Airflow & Indoor RH for Comfort**  
High efficiency comfort systems for homes with low thermal loads, including optimal efficiency, managed air flow and RH control at all part load conditions

### **Smarter Indoor Air Quality Solutions**

- **Control Fresh Air Supply & Contaminant Removal**  
Added tightness with improved source control, dilution, and high efficiency filtration, with little or no energy penalty

# Building America FY16 Planning Timeline



# Building America Planned FOA Schedule (subject to appropriations)

	FY2015				FY2016				FY2017				FY2018				FY2019			
Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
NREL contract down select (FY15 bridge-funding)	\$ High-R																			
	\$ Comfort																			
	\$ IAQ																			
	FOA15			FY15 FOA Award #1																
				FY15 FOA Award #2, etc.																
					FOA16			FY16 FOA Award #1												
								FY16 FOA Award #2												
								FY16 FOA Award #3, etc.												
									FOA17			FY17 FOA Award #1								
												FY17 FOA Award #2								
												FY17 FOA Award #3, etc.								

## Notes:

1. All FOA's are fully funded up front

2. No. of awards each year will depend on award negotiations and budget.



# Integrated Roadmaps

- A. High Performance, Moisture Managed Envelope Systems
- B. Optimal Comfort Systems for Low Load Homes
- C. Optimal Ventilation Systems and IAQ Solutions for Low Load Homes

## Overall Roadmap Objectives:

- Codes and Standard practice as endpoints
- Manage risks to minimize problems of adoption
- Address optimal performance & cost-effectiveness
- Solutions must be practical & profitable for builders and home improvement contractors

## KEY:

Research & Development

Market Engagement

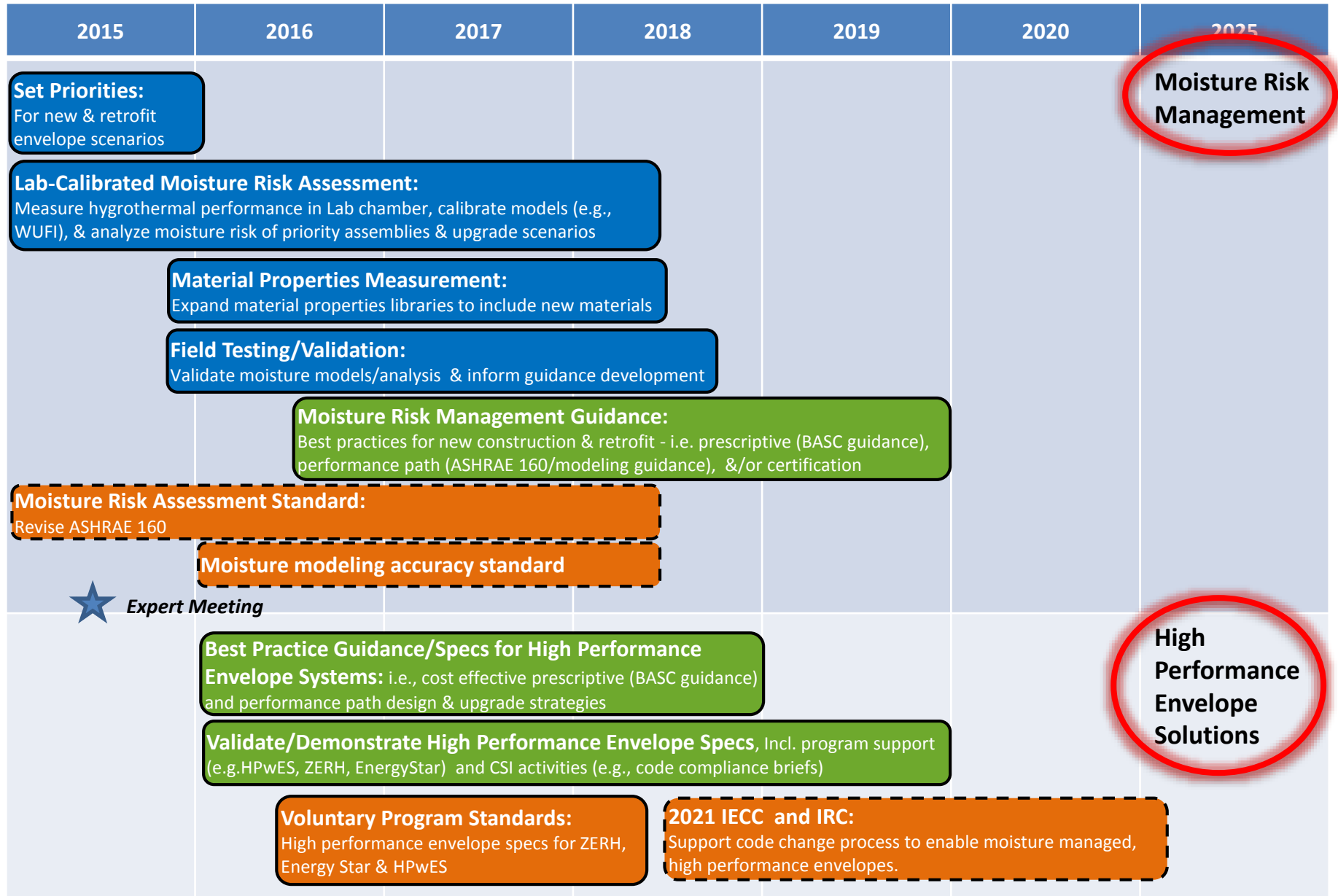
Codes & Standards

DOE lead

Industry lead

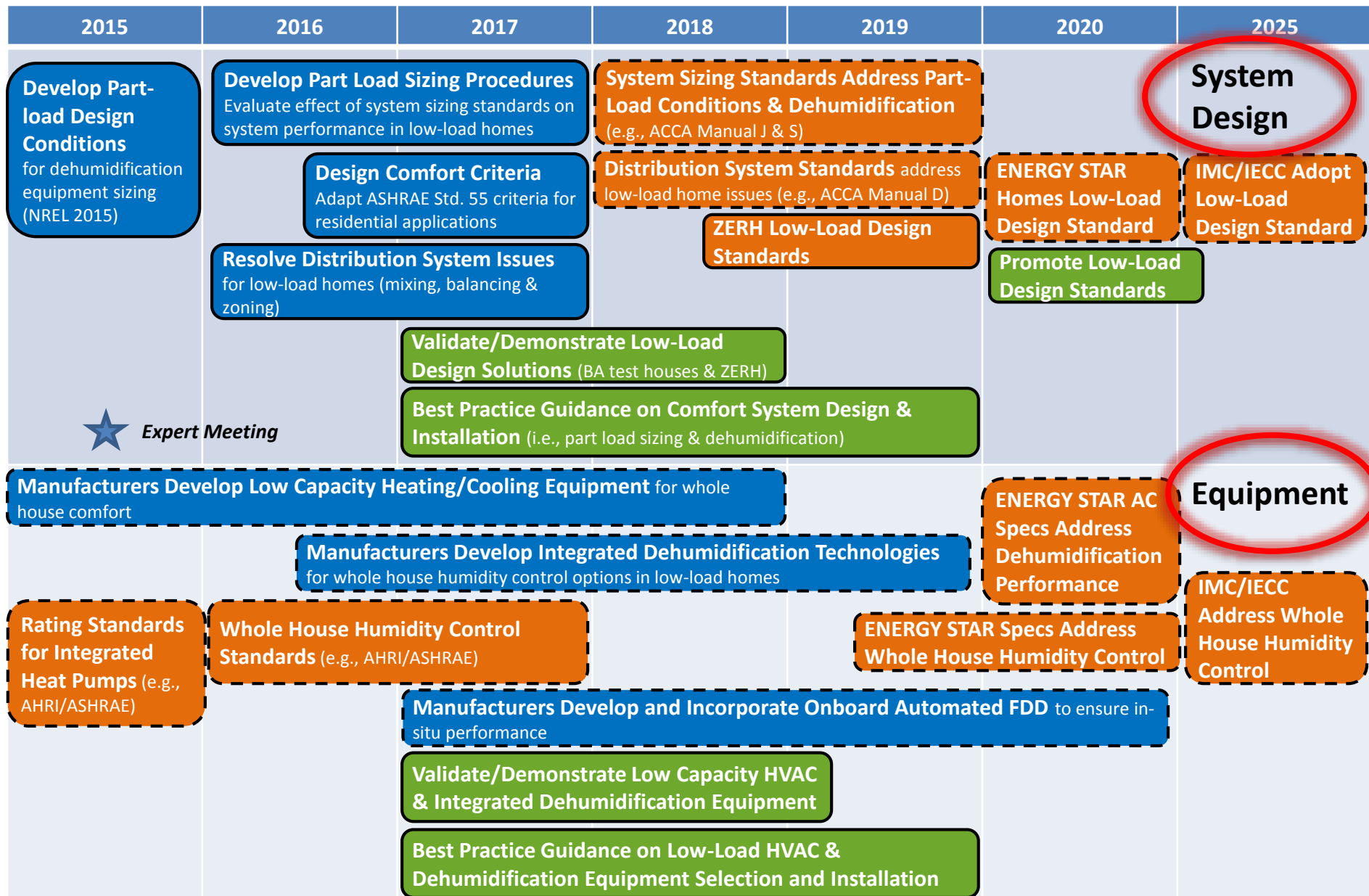
# Building America Technology-to-Market Roadmap

## High Performance Moisture Managed Envelope Solutions



# Building America Technology-to-Market Roadmap

## Optimal Comfort Systems for Low-Load Homes



## C. OPTIMAL VENTILATION SYSTEMS & IAQ SOLUTIONS FOR LOW LOAD HOMES



### INTEGRATED ROADMAPS

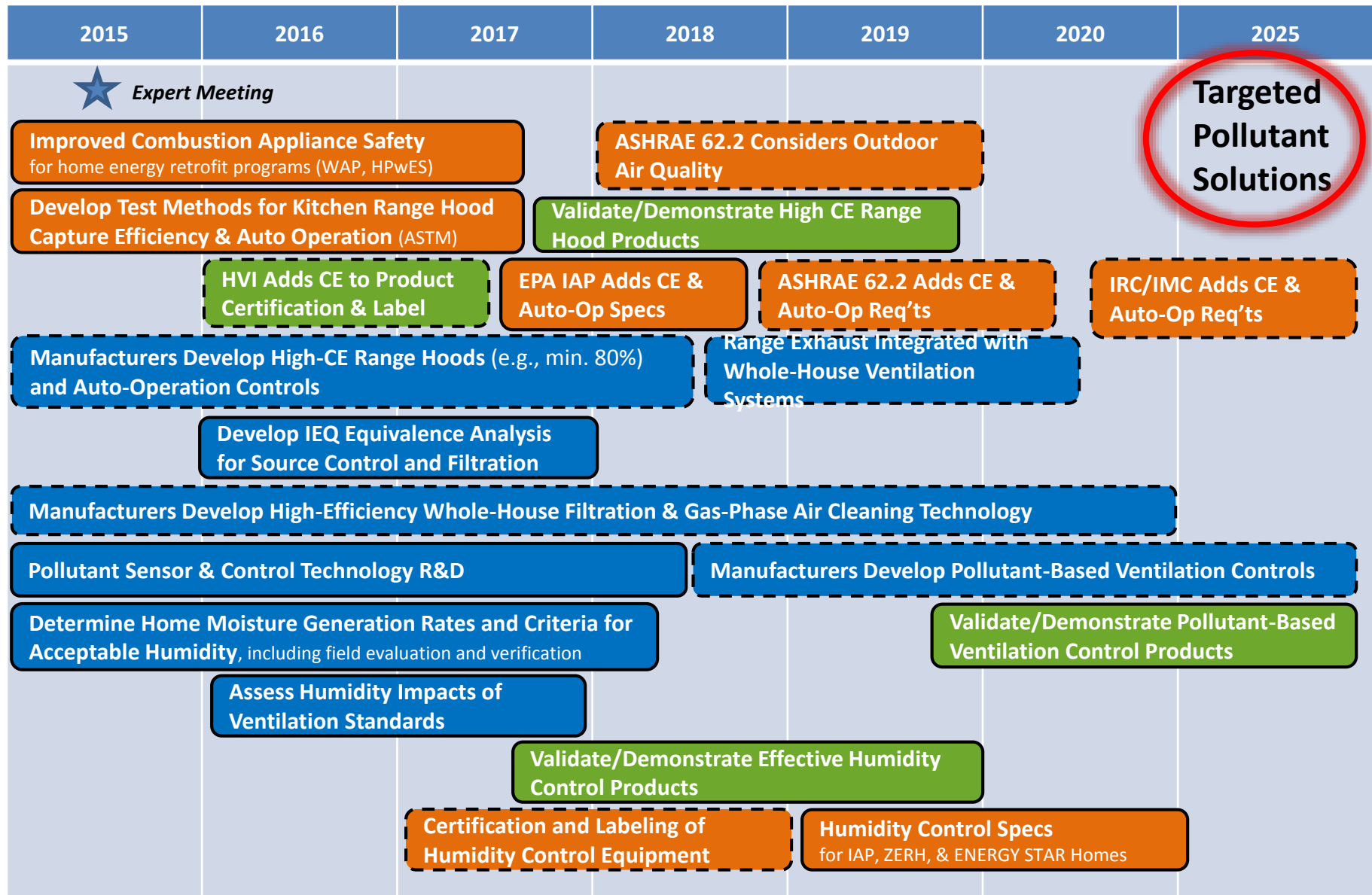
- I. Targeted Pollutants/Non-Dilution Solutions
- II. Smart Ventilation Technology Solutions
- III. IAQ Valuation & Equivalence in Standards

#### Roadmap Objectives:

- Industry Standards, Codes & New Technologies as Endpoints
- Priority Issues to Address:
  - Health effects of PM2.5 exposure is high, while control technologies & standards are missing/limited (i.e., kitchen range hoods & advanced filtration)
  - Current state of the art ventilation technologies limited in flexibility for energy & DR management, do not adequately address RH & airflow, and are expensive
  - Combustion safety testing standards are expensive & can lead to both false negatives & false positives for health risks
  - Industry ventilation standard limited in flexibility, doesn't adequately address sources, RH & airflow, and is not universally adopted by building codes

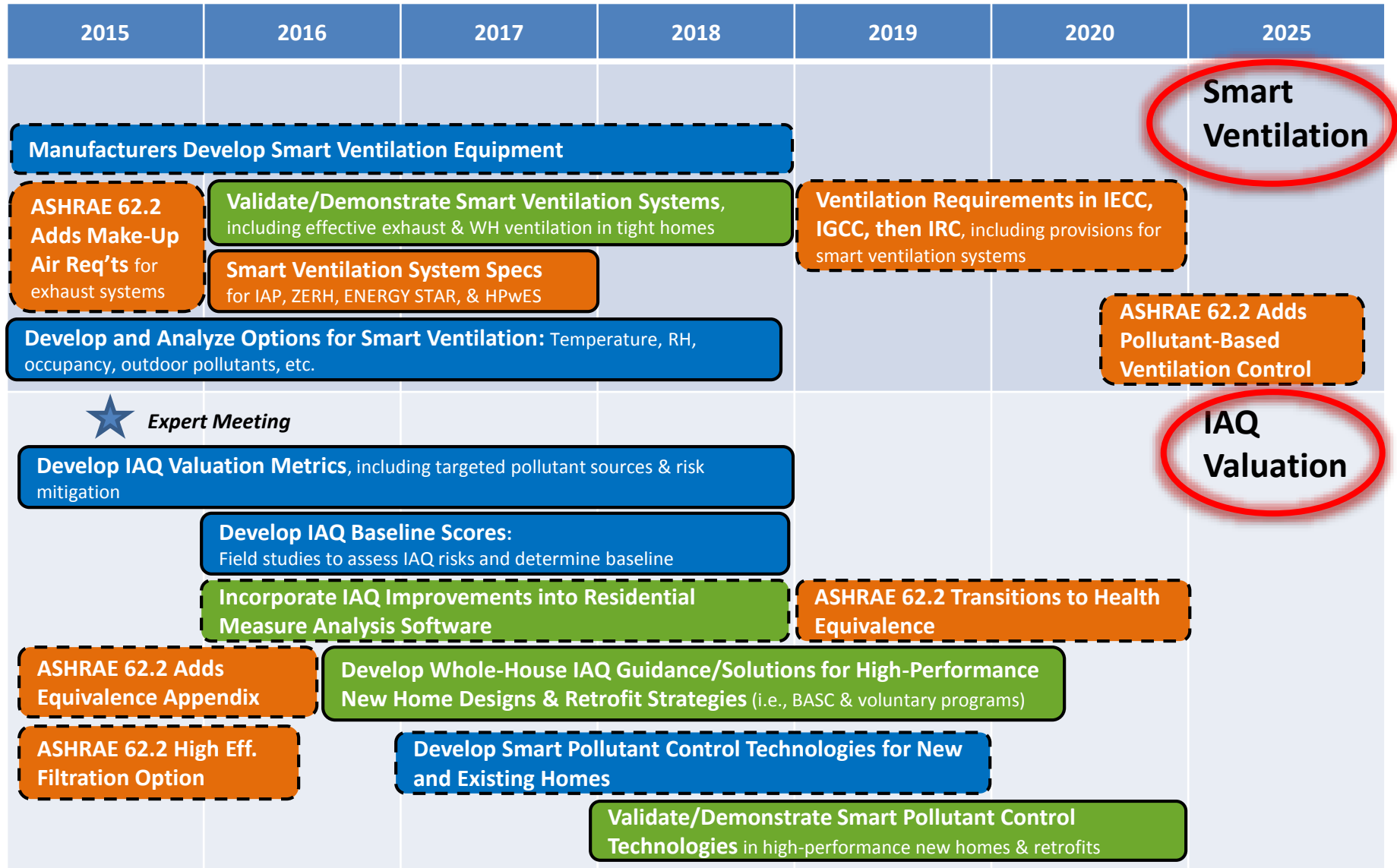
# Building America Technology-to-Market Roadmap

## Optimal Ventilation & IAQ Solutions



# Building America Technology-to-Market Roadmap

## Optimal Ventilation & IAQ Solutions



## Thank You

**For More Information:**

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